

Consolidated Program for Research and Development for Welding of High Strength Steel Pipelines, #277 & 278

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QUARTERLY REPORT

Project WP#277: Update of Weld Design, Testing, and Assessment Procedures for High Strength Pipelines

For Period Ending: November 30, 2008

Contract No: DTPH56-07-T-000005

Prepared For: United States Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Office of Pipeline Safety

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Background

High strength pipelines are expected to become a major player in long distance onshore hydrocarbon transportation. Understanding the differences between the modern high strength and older-generation linepipes is critical to the safe and economical application of those modern materials. The objectives of this project to fill the critical gaps and provide guidelines on the effective use of high strength linepipes, from design and testing to weld integrity assessment procedures. The interdependence of linepipe materials, welding processes, design requirements, and weld integrity will be investigated to enable realistic and effective use of high strength linepipes.

Progress in the Quarter

The activities in the fifth quarter of this project covered (1) development of test specimen allocation plans for the completed first round of rolled welds, (2) update linepipe specifications, (3) continued development of weld metal tensile and toughness testing protocols, (4) further analysis of weld strength mismatch requirements for stress- and strain-based designs, and (5) preparing for medium scale testing.

A full project review meeting was held on October 20, 2008, at the Lincoln Electric Facilities. Joint web-conferences with Project 278 have been held once every two weeks. Specimen cutting plans were developed for the completed first round of girth welds. Task report on linepipe property specifications has been drafted. Work is under way to address girth weld tensile strength test methods using a range of specimen geometries, including standard round bars, full-strip and split-strip tensile specimens. The development of fracture toughness testing protocol is continuing with both experimental testing and numerical simulation. A draft SE(T) testing protocol has been issued. SE(B) and SE(T) specimens have been machined and tested. A large matrix of analysis has been completed to develop weld strength mismatch requirements for both stress-based and strain-based designs. The preparation for medium scale testing is largely complete. Trial specimens have been fabricated and shipped to NIST. The medium scale testing is expected to start in January 2009.